
A New Species of *Bouvardia* (Rubiaceae) from Mexico, and Transfer of *Hedyotis xestosperma* to *Bouvardia*

Edward E. Terrell

Department of Botany, University of Maryland, College Park, Maryland 20742, U.S.A.

Stephen D. Koch

Centro de Botánica, Colegio de Postgraduados, 56230 Chapingo, Edo. de México, Mexico

ABSTRACT. *Bouvardia rzedowskii*, a new species from Oaxaca and Guerrero, Mexico, is described. We also note the rediscovery of the rare Oaxacan endemic *Hedyotis xestosperma* and transfer it to *Bouvardia*.

Among specimens lent several years ago to Terrell from Mexican herbaria were two collections by Jerzy Rzedowski and one by David Lorence of an unknown *Bouvardia* from a locality in northwestern Oaxaca. The collections had been identified as *Oldenlandia xestosperma* Robinson & Greenman or *Houstonia xestosperma* (Robinson & Greenman) Terrell, a rare Oaxacan endemic that is similar to the unknown *Bouvardia*.

During a 1987 trip to study *Houstonia* and related genera we collected the *Bouvardia* at its only then-known locality in Oaxaca, and one of us (Koch) also rediscovered *Hedyotis xestosperma*, previously known only from four old collections. Here we describe the unknown *Bouvardia* and transfer *Hedyotis xestosperma* to *Bouvardia*.

Bouvardia rzedowskii Terrell & S. D. Koch, sp. nov. **TYPE:** Mexico. Oaxaca: Ladera caliza con vegetación de encinar, alt. 2,300 m, 6 km al SW de Tamazulapan, sobre la carretera a Chilapa, 12 Aug. 1977, *J. Rzedowski 35142* (holotype, ENCB; isotypes, ARIZ, ASU, MICH, XAL). Figure 1.

Herba perennis rhizomata; folia opposita linearia; inflorescentia parva, cymis paucifloris; corolla 6–12 mm longa, late tubiformis, rubra vel scarlatina, cum vel sine lineas luteas vel aurantiacas vittata, tubo 5–11 mm longo; semina 1.2–1.6 mm diametro, complanata, suborbicularia, anguste alata.

Perennial herbs with a semiwoody oblique or horizontal rhizome to 5 mm thick. Stems 15–50 cm tall, slender, erect, terete, internodes densely and minutely puberulent, simple or sparsely branched. Leaves 2–8 cm long, 0.5–2 mm wide, opposite, sessile, linear, thickish, glabrous, apices sharply acute.

Stipules 1–6 mm long, greenish, narrowly lanceolate to subtriangular, puberulent or glabrous, apices acute, acuminate, caudate, bifid, or toothed, sometimes with colleters. Inflorescence of heterostylous flowers in small few-flowered terminal cymes, pedicels 0.5–5 mm long, erect, slender, puberulent. Calyces 4–6-lobed; lobes 0.5–3 mm long, 0.3–0.5 mm wide, subtriangular to narrowly lanceolate, acute, glabrate, puberulent or pubescent. Corollas 4–5-lobed, 6–12 mm long, broadly funnelform, red or scarlet externally with or without broad longitudinal yellow or orange bands, yellow or orange within, glabrous externally; tubes 5–11 mm long, 3–6 times longer than the lobes, 1–3 mm wide at base, 2.5–7 mm wide at throat, basal $\frac{1}{4}$ – $\frac{1}{2}$ of tube densely pubescent within with hairs to 0.8 mm long, median and distal parts of the tube glabrous within; lobes 1–5 mm long, 1–4 mm wide, broadly ovate or subtriangular, obtuse, somewhat incurved, connivent, not spreading or reflexed, glabrous within. Anthers 4–5, 1–3 mm long, 0.3–0.4 mm wide, linear, sessile or on filaments to 0.5 mm long. Stigmas with 2 linear lobes 1.5–2.5 mm long. Pin flowers with stigmas located in distal part of corolla tube or slightly exerted; anthers included, located at $\frac{1}{4}$ – $\frac{1}{3}$ of the distance from the corolla tube base. Thrum flowers with anthers included, located at $\frac{1}{2}$ – $\frac{3}{4}$ of the distance from the corolla tube base; stigmas included, located at $\frac{1}{3}$ – $\frac{1}{4}$ of the distance from the corolla tube base. Capsules 3–5 mm long, 3.5–4.5 mm wide, subglobose, $\frac{4}{5}$ to almost fully inferior, thick-walled, glabrous. Seeds 1.2–1.6 mm diam., black or brown, strongly compressed, flat or concavo-convex, suborbicular in outline, ventral face with thickened hilar area near center of seed, hilum punctiform, wing 0.1–0.35 mm wide, brown, papery, fragile, surrounding all or most of seed, testa finely reticulate, with minute radial striae from the hilum. Chromosome number unknown.

Distribution. *Bouvardia rzedowskii* occurs in northwestern Oaxaca and adjacent western Guerrero at 2,000–2,400 m. The habitat at the type



Figure 1. Isotype (XAL) of *Bouvardia rzedowskii* Terrell & S. D. Koch, with one inflorescence enlarged.

locality is gladelike, with open places interspersed with shrubby oaks in well-drained soil over limestone.

The new species resembles *B. rosea* Schlechtendahl and *B. tenuifolia* Standley in being an herbaceous perennial with linear leaves. Unlike these species, *B. rzedowskii* has opposite rather than 3-6-nate leaves, the latter an important characteristic of subgenus *Bouvardia* in Blackwell's (1968) key to subgenera. *Bouvardia tenuifolia* has externally pubescent corollas that are tubular, red, and 8.5-31 mm long. The species occurs in Jalisco, Sinaloa, and Durango. *Bouvardia rosea* has externally glabrous corollas that are salverform, rose, violet-blue, or pink, and 7.5-25 mm long. This species is known from San Luis Potosí, Guanajuato, Queretaro, and Hidalgo. *Bouvardia rzedowskii* has externally glabrous corollas that are 5-12 mm long, broadly tubular, and red or scarlet with or without yellow or orange longitudinal bands. The flowers are conspicuous and attractive.

With respect to its placement in *Bouvardia* or *Hedyotis*, *B. rzedowskii* has such bouvardioid characteristics as flat, winged seeds, terminal few-flowered cymes, and rather thick-walled capsules that are larger than the usual *Hedyotis* capsules. It also has greenish, narrow, herbaceous stipules in contrast to the usual whitish scarious stipules occurring in *Hedyotis*.

Paratypes. MEXICO. **Oaxaca:** type locality, 3 July 1977, *Rzedowski 34854* (ENCB); Distr. de Teposcolula, ca. 8 km al SO de Tamazulapan, camino a Chilapa, 8 Aug. 1981, *D. H. Lorence et al. 3717* (CAS); Distr. de Teposcolula, 5 km al NO de Tamazulapan, Mexteca Alta, alt. 2,400 m, 25 Aug. 1983, *A. García Mendoza 1242* (ENCB); Mpio. Tamazulapan, 6 km al SO de Tamazulapan, alt. 2,300 m, 16 July 1987, *Koch & Terrell 879* (CAS, CHAPA, IEB, MEXU, MICH, TEX, US), 14 Oct. 1989, *Koch & Koch 8935* (seeds only) (CHAPA); Distr. de Huajuapán, a 23 km al NO de Huajuapán de León, camino a Ciénaga Zahuatlán, 19 Sep. 1982, *M. Sousa S. et al. 5922* (MEXU). **Guerrero:** Mpio. de Xalpatláhuac, 32 km al S de Tlapa, camino a Malinaltepec, alt. 2,240 m, 26 June 1982, *E. Martínez S. 1088* (MEXU); Mpio. de Tlapa, 34 km al S de Olinalá, camino a Tlapa, alt. 2,000 m, 27 June 1982, *E. Martínez S. 1137* (ENCB).

***Bouvardia xestosperma* (Robinson & Greenman)**

Terrell & S. D. Koch, comb. nov. Basionym: *Oldenlandia xestosperma* Robinson & Greenman, Proc. Amer. Acad. Arts 32: 41. 1896. *Hedyotis xestosperma* (Robinson & Greenman) W. H. Lewis, Rhodora 63: 222. 1961. *Houstonia xestosperma* (Robinson & Greenman) Terrell, Brittonia 32: 493. 1980. TYPE: Mexico. Oaxaca: open glades, Sierra de San Felipe, 8,000 ft., June 1894, *C. G. Pringle 4692* (lectotype, designated by Terrell (1980),

GH; isoelectotypes, BM, CM, F, K, MEXU—2, MICH, MO, MSC, PH, US—2, VT).

Distribution. *Bouvardia xestosperma* is rare in open glades and rather open and cut-over pine or pine-oak forest between 2,000 and 2,700 m. Only the type and three other old collections were known prior to 1987. We were unable to relocate the species at any of the old localities in July 1987, prior to Koch's rediscovery of the species at the two new localities. Besides the type locality, the species is now recorded from five other sites.

Terrell (1980) noted that the specific epithet, "xestosperma," refers to shiny seeds, and these were described by Robinson & Greenman (1896) as yellowish, highly polished, and shiny. The lectotype has an attached packet with small shiny seeds, but these did not come from the lectotype specimens, as they are not hedyotoid and probably not rubiaceae. In October 1989, mature seeds were gathered (*Koch & Koch 8934*) from the population represented by *Koch & Terrell 8730*. Attempts to germinate the seeds were not successful.

Hedyotis xestosperma previously has been considered an anomalous species without any apparent particular resemblances to other Mexican species of *Hedyotis* (Terrell et al., 1986). Terrell (1991) listed it in the genus *Hedyotis*, while noting that *Hedyotis* is a "dustbin genus" and pertains mainly to Asian species. *Hedyotis xestosperma* is very similar to *Bouvardia rzedowskii* in having the following morphology: similar general habit, conspicuous rhizomes, linear leaves, stipule structure, terminal few-flowered cymes, and similar capsule and seed morphology; consequently, we have no hesitation in transferring it to *Bouvardia*. The two species differ as expressed in the following key:

- 1a. Calyx lobes 0.3-0.5 mm wide; corollas 6-12 mm long, red or scarlet externally with or without longitudinal yellow or orange bands, yellow or orange within; corolla tubes 5-11 mm long, about 3-6 times longer than lobes, basal 1/4-1/2 densely pubescent within; corolla lobes connivent or erect, not spreading or reflexed; pin flowers with stigma lobes located in distal part of corolla tube or slightly exerted; mature capsules 3-5 mm long *Bouvardia rzedowskii*
- 1b. Calyx lobes 0.5-1 mm wide; corollas 5-10.5 mm long, deep to light pink externally, creamy white within; corolla tubes 4-7.5 mm long, 2-4 times longer than lobes, glabrate within; corolla lobes spreading or reflexed; pin flowers with stigma lobes exerted 1-2 mm beyond corolla throat; mature capsules 2.5-4 mm long *Bouvardia xestosperma*

Additional specimens examined. MEXICO. **Oaxaca:** Cerro de San Felipe, *Conzatti & Gonzalez 248* (GH,

MEXU); Distr. Nochixtlan, Camino Montelobos, Rancho Nopalero, *Conzatti 1853* (F); mountainside in pine land above Tejocote, *Lundell 12291* (LL, MICH); Mpio. San Andrés Nuxiño, 2 km al S de La Carbonera, por la carretera Oaxaca-Izúcar de Matamoros, bosque abierto de pino, suelo arenoso, *Koch & Terrell 8727* (US); Mpio. Sto. Domingo Nuxaa, Terracería a Ojo de Agua, 5 km al S de La Herradura (56 km al NO de Oaxaca), carretera Oaxaca-Izúcar de Matamoros, bosque de pino y encino muy abierto (parcialmente talado), suelo franco-arenoso, *Koch & Terrell 8730* (CHAPA, ENCB, MEXU, XAL), *Koch & Koch 8934* (seeds only) (CHAPA).

Acknowledgments. We thank J. L. Reveal and the Botany Department, University of Maryland, for support and facilities. J. J. Wurdack helpfully provided a Latin diagnosis. Other members of the Botany Department, Smithsonian Institution, have provided information and use of facilities during past years. The curators of the following herbaria lent specimens for study or made specimens available during visits: ARIZ, ASU, BM, CAS, CHAPA, CM, ENCB, F, GH, K, MEXU, MICH, MO, MSC, PH,

TEX/LL, US, VT, XAL. This is Scientific Article No. A-6500, Contribution No. 8707, of the Maryland Agricultural Experiment Station.

Literature Cited

- Blackwell, W. H., Jr. 1968. Revision of *Bouvardia* (Rubiaceae). *Ann. Missouri Bot. Gard.* 55: 1-30.
- Robinson, B. L. & J. M. Greenman. 1896. VI.—Descriptions of new or little known phanerogams, chiefly from Oaxaca. *Proc. Amer. Acad. Arts* 32: 41-42.
- Terrell, E. E. 1980. Two new species and a new combination in *Houstonia* (Rubiaceae) from Mexico. *Brittonia* 32: 490-494.
- . 1991. Overview and annotated list of North American species of *Hedyotis*, *Houstonia*, *Oldenlandia* (Rubiaceae) and related genera. *Phytologia* 71: 212-243.
- , W. H. Lewis, H. Robinson & J. W. Nowicke. 1986. Phylogenetic implications of diverse seed types, chromosome numbers, and pollen morphology in *Houstonia* (Rubiaceae). *Amer. J. Bot.* 73: 103-115.